A. I. A. File No. 17-A

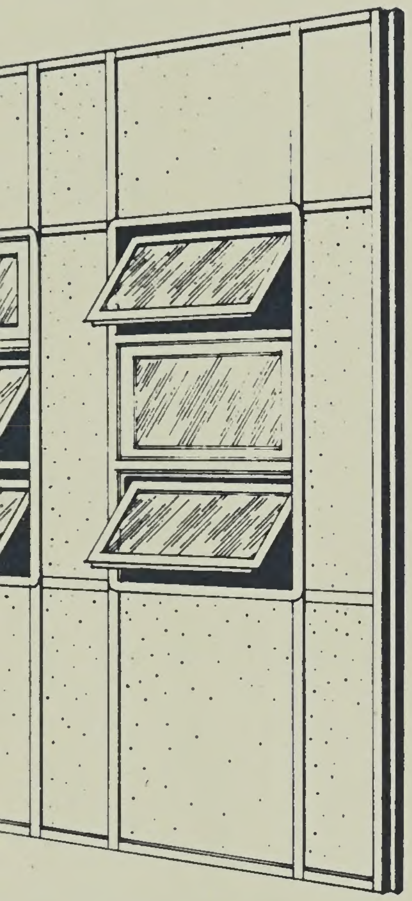
ARCHITECT'S SKETCH BOOK

of Porcelain Enamel Wall Panel Systems

A. I. A. File No. 17-A

THE Erie ENAMELING COMPANY
ERIE, PENNSYLVANIA

PORCELAIN ENAMEL PANELS DEVELOPED FOR SUSPENDED WALL SYSTEMS

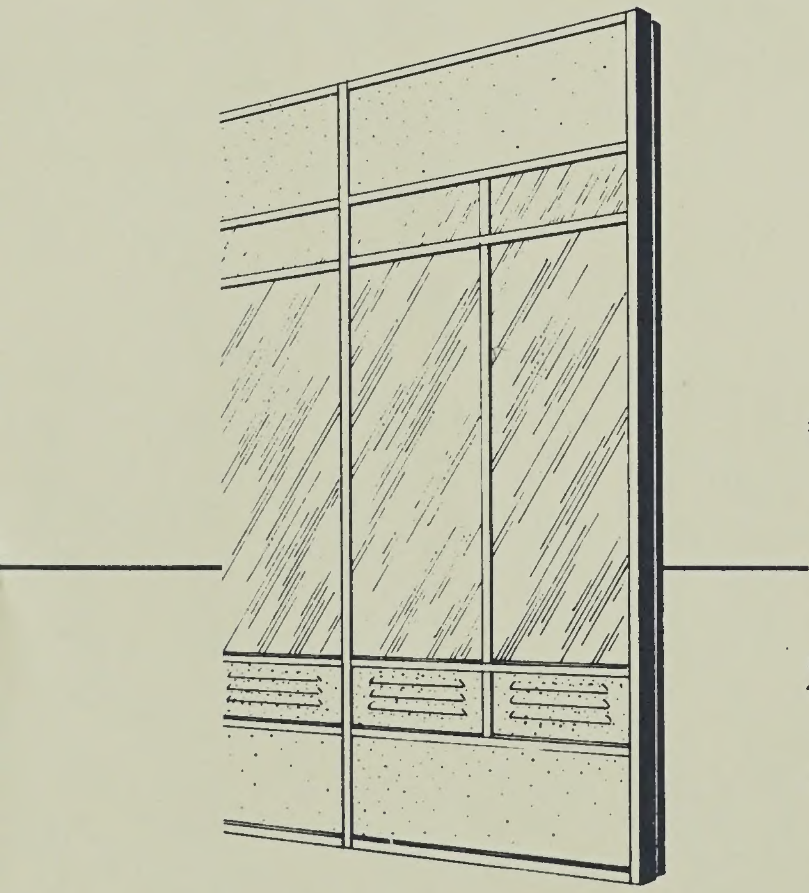


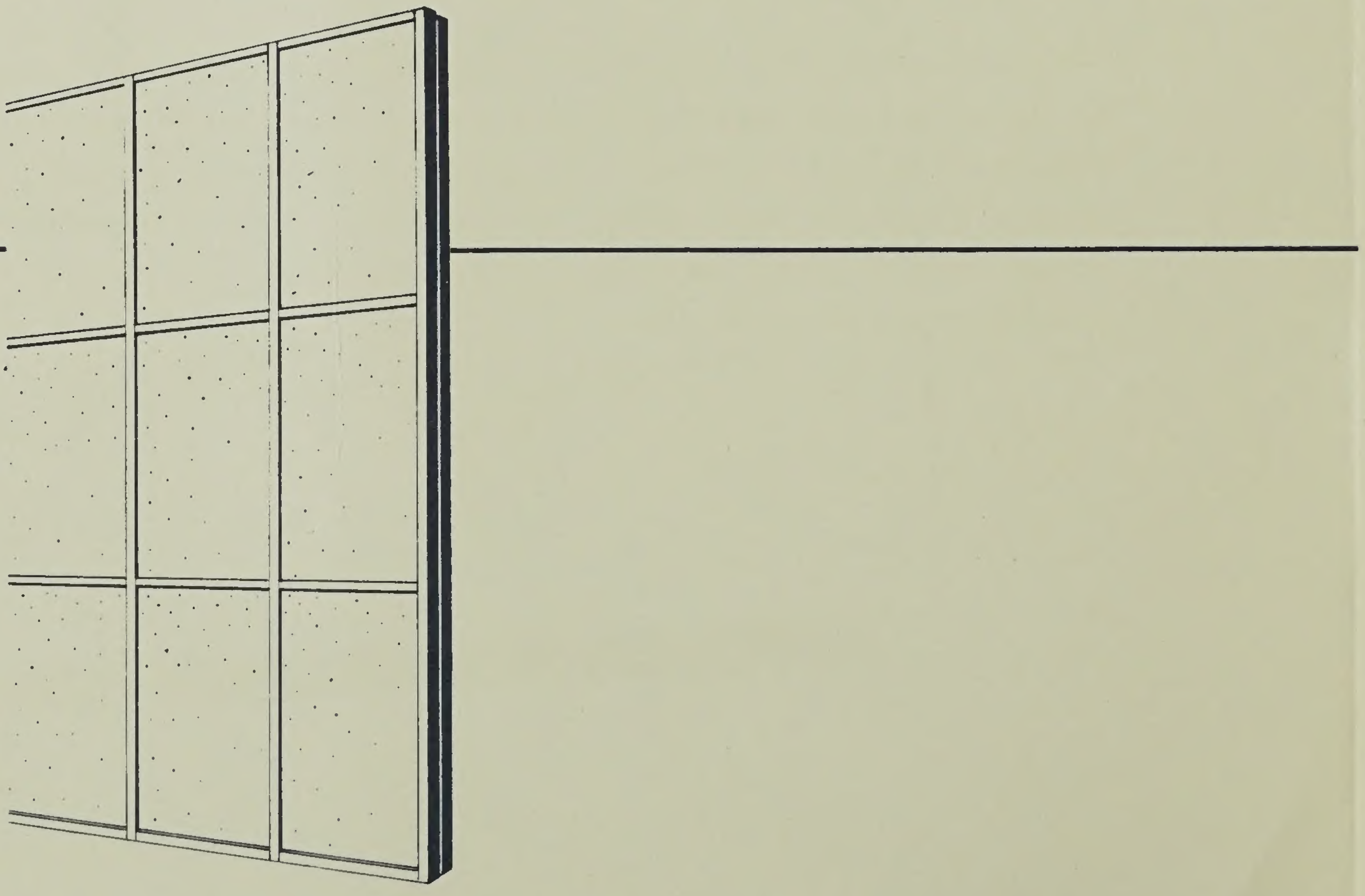
A new series of porcelain enameled panels which are intended specifically to meet the demand for panel walls of the curtain wall, window wall or spandrel type have been developed by The Erie Enameling Company.

Unlike the more familiar pan-and-lug type of porcelain enameled panel previously furnished, the new panels are faced on both sides and insulated. They are intended to be carried by a secondary framework which may be either sash frames or a mullion bar system attached to the main structural frame. This method eliminates the usual masonry wall and furring and permits completed walls to be erected in one operation.

THREE MAIN APPLICATIONS

The Erie panel designs are adapted to use in spandrel systems, window walls or panel walls. A secondary structural system of extruded shapes or tubular forms is required to support each panel. An alternate method is the use of sash sections to accommodate glazing and porcelain enamel.



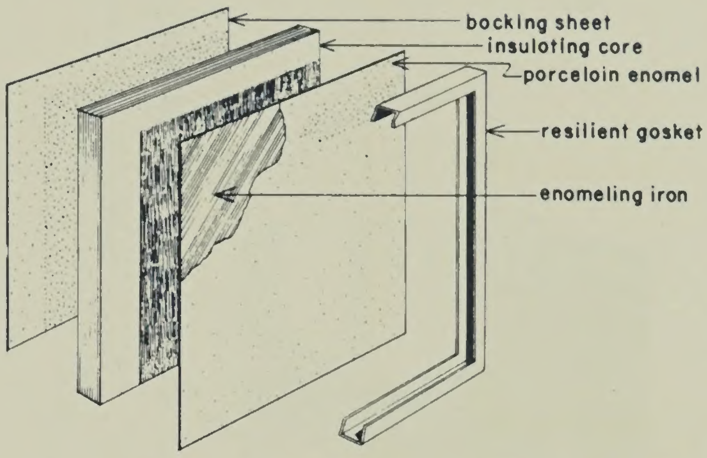


PANEL CONSTRUCTION

The Erie architectural porcelain enamel panel designs fall into three general types, each having adaptability to different wall treatments and methods of support.

1. Laminated Construction

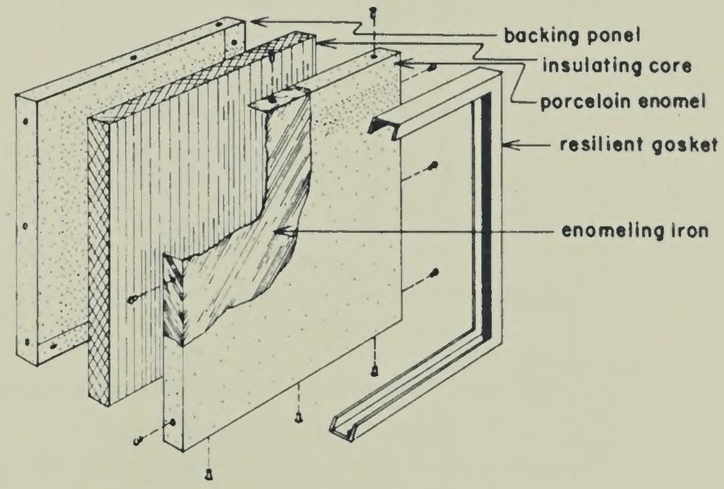
The laminated sandwich panel consists of two flat sheets laminated to a rigid core by means of heat, pressure and adhesives. Erie provides a sandwich panel of this nature consisting of two lightweight porcelain enameled flat sheets laminated to any rigid core material. When porcelain enamel is desired only for the exterior surface of the sandwich, an alternate metal is substituted on the opposite side.



Exploded View of Laminated Panel

2. Box Panel

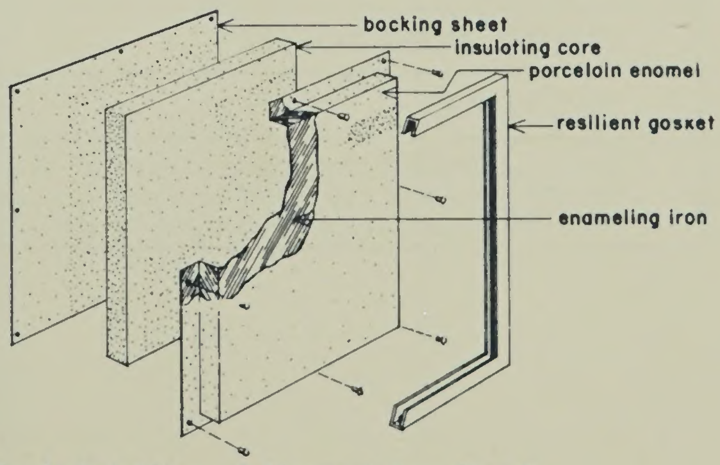
The Erie box type panels consist of two flanged panels inserted within each other and mechanically fastened to form a completely enclosed box of desired thickness. These panels are insulated prior to assembly, using any of the standard rigid or bat-type insulation materials. The mechanical fastening of these panels is on the flange areas, where the fasteners are not exposed to view. Panels may be gasketed during assembly to seal against air and moisture movement.



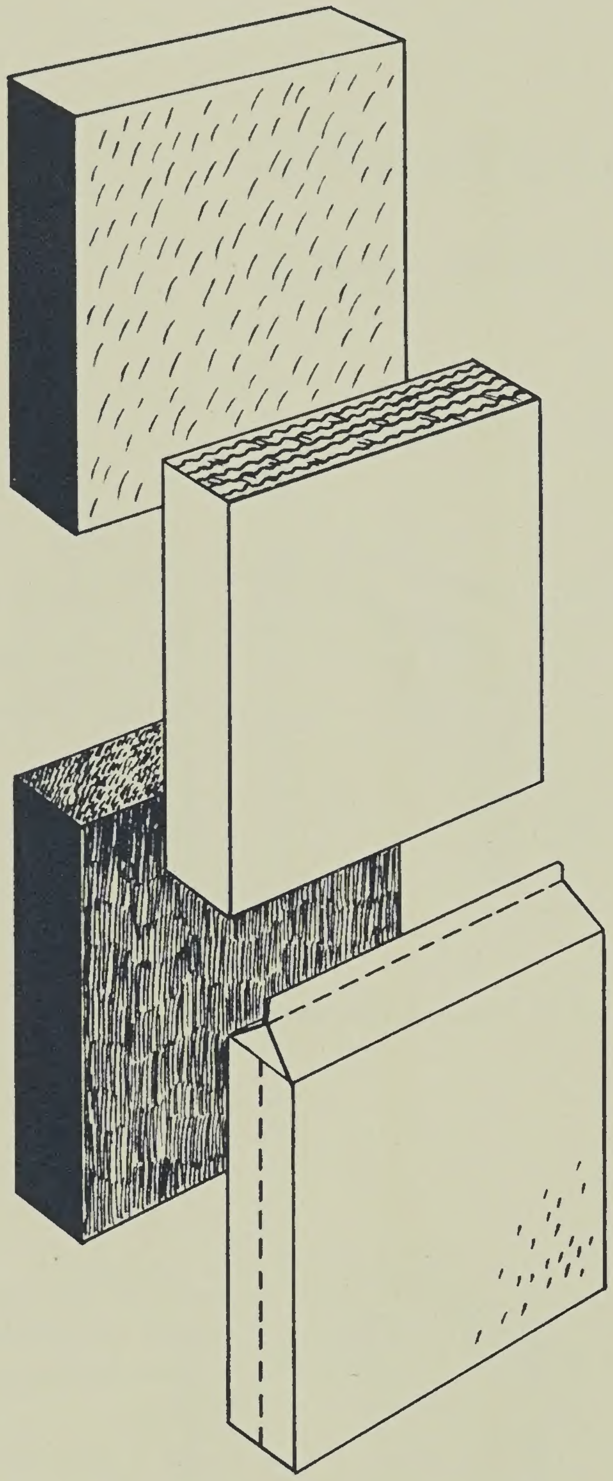
Exploded View of Box Panel

3. Flanged Box Panel

Erie flanged box panels are also of the box type and differ only in having an extended right angle flange on all four sides which is intended to suit other methods of attachment and support in the wall system. These are mechanically fastened through the extended flanges. Like the box panel, these can have any desired type of core material to suit the application.



Exploded View of Flanged Box Panel



CORE MATERIALS

Core materials are used primarily for insulation. In the case of laminated panels, however, the core must also provide rigidity. Consequently, the selection of a proper core must be based upon requirements for rigidity, degree of thermal and acoustical insulation desired and thickness limitations.

Because the laminated panels require a rigid core, board type insulation composed of wood fibre, cement-asbestos, cane fibre, foam glass or preformed glass fibre are used. Honeycomb cores made of paper or aluminum are also satisfactory, however they have limited insulation value.

The box type, totally enclosed panels, will accommodate any of the semi-rigid or bat type insulating materials such as glass wool, rock wool and fibre glass as well as the rigid types named above.

	LAMINATED SANDWICH	BOX PANEL	FLANGED BOX PANEL
CANE FIBRE BOARDS	x	x	x
FOAM GLASS	x	x	x
PREFORMED FIBRE GLASS	x	x	x
PRESSED WOOD FIBRE BOARDS	x		
ASBESTOS AND CEMENT BOARDS	x		
FIBRE GLASS BATS		x	x
PAPER HONEYCOMB	x		
PLYWOOD	x		

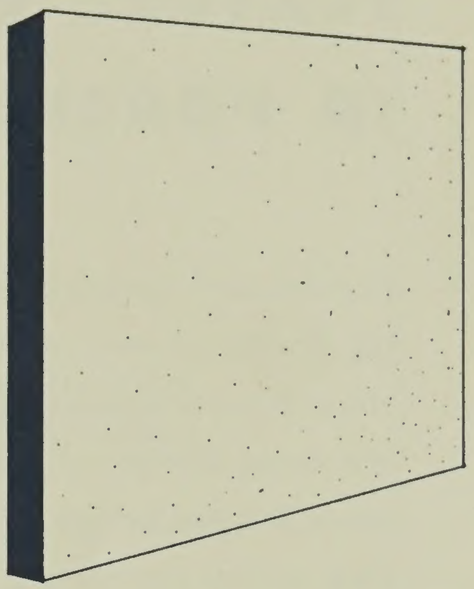
Since the physical properties of each of these types of core materials varies between manufacturers and with the thickness and weight of material, it is recommended that the architect obtain the detailed specifications from the manufacturer of the core materials.

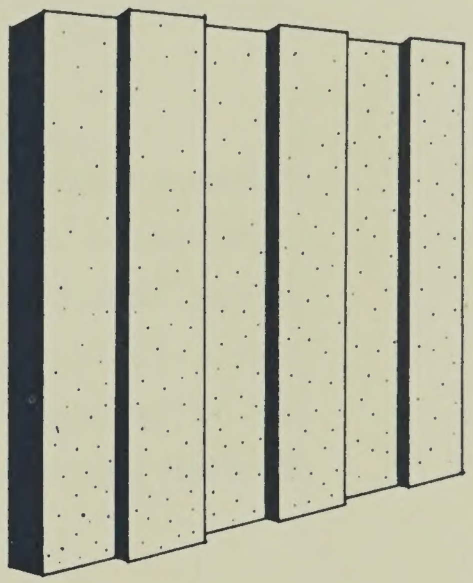
PANEL FACE TREATMENTS

Exterior panel surfaces are often furnished in a fabricated design to provide relief from continuous use of plain surfaces. Panels can be furnished box corrugated, fluted or embossed with an inverted pyramidal design.

Plain surfaced or embossed panels offer no serious problems from the standpoint of fabrication or attachment because the perimeter of the panel is not affected by the design. Box corrugated or fluted panels, however, increase fabrication costs both for forming and welding. Careful planning is also required where corrugated or fluted panels are used to provide proper mountings and an effective seal against the elements.

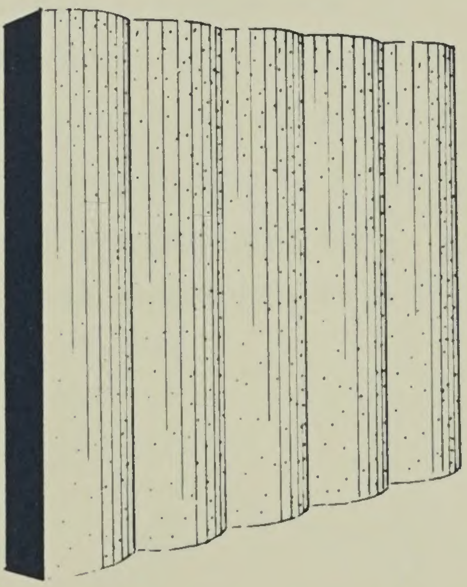
Plain panels with texture designs embossed in the surface of the front panel are being rapidly developed to provide physical surface texture.

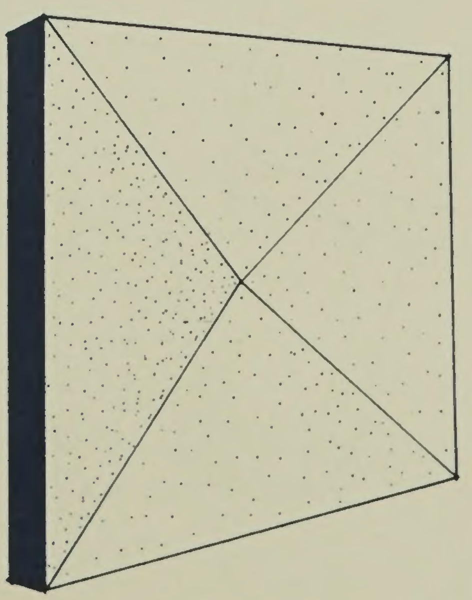




COLOR IN PORCELAIN ENAMEL

Porcelain enamel is largely responsible for the modern trend in architectural design which permits the architect full freedom to blend color and design. Literally any color desired can be produced in porcelain enamel and several hundred standard colors are readily available. Hundreds more variations can also be produced by spraying several colors in a spatter combination to produce not only unusual color effects but also the appearance of texture. All colors used in acid resisting architectural porcelain enamel are fade-proof and permanent under all normal weathering conditions.



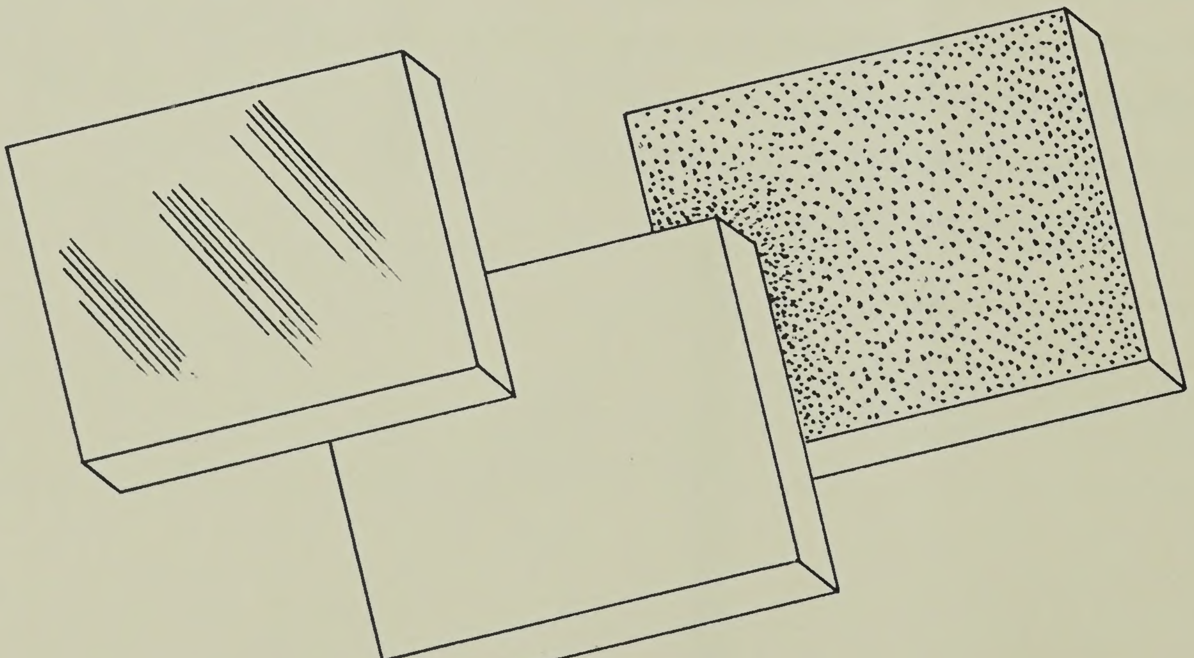


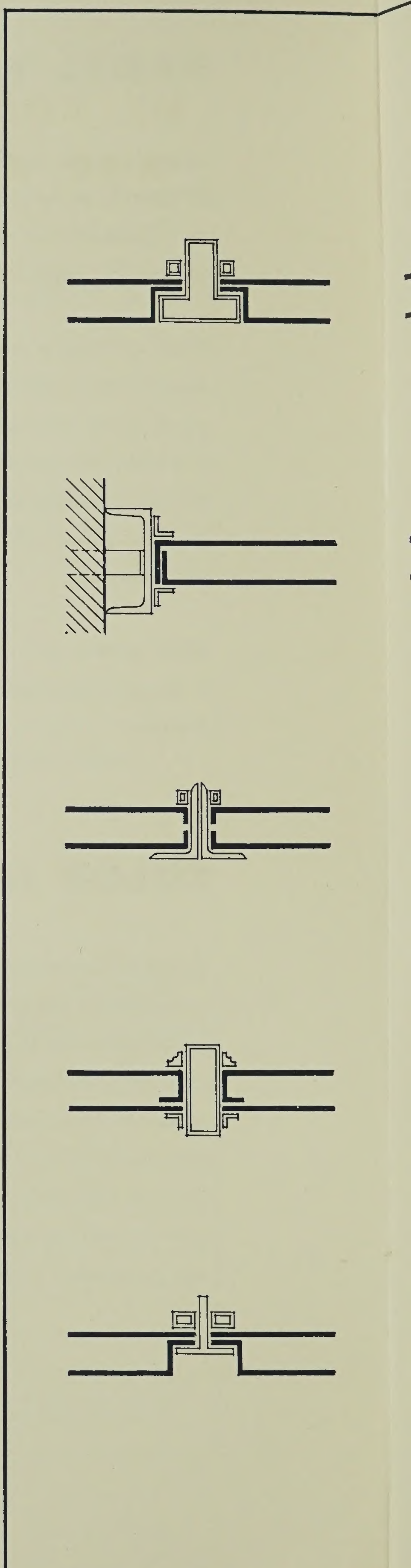
TEXTURE AND FINISHES IN PORCELAIN ENAMEL

Architectural porcelain enamel is furnished in high gloss or varying degrees of satin or matte finish. In general, the high gloss provides greatest satisfaction from the standpoint of shedding dirt and remaining stainproof. Matte finishes offer a "tooth" that tends to retain soil and surface stains. Matte colors are also less stable. Where these factors are not too important, however, the use of matte finishes permits interesting changes in appearance.

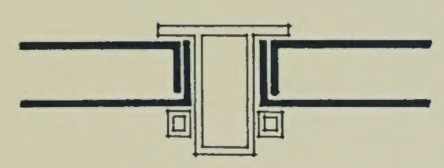
Relatively limited texture can be provided in plain porcelain enamel as its natural tendency is to flow out smooth during the firing process. However, very interesting stippled effects, which provide both a visual and limited physical texture, are easily furnished. This can be further complemented by combining colors in the stipple. Excellent granite and terra cotta finishes can also be produced.

A new method of providing texture which will furnish a wide variety of actual physical textures in surface sheets of Erie panels, is currently under intensive development at Erie. This method consists of embossing designs into the steel sheets before porcelain enameling and will provide overall designs such as herringbone, diamond patterns, etc.



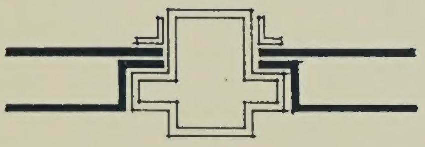


METHODS OF SUPPORTING AND ATTACHING PANELS

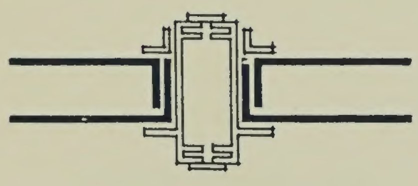


The Erie panels are designed for fastening into a lightweight corrosion-resistant framework which is carried by the main structural frame of the building.

The frameworks best adapted to the Erie panels are: (1) sash frames or, (2) mullion bar systems developed from tubular forms or extrusions. This provides a wide selection of suspension systems, as there are a number of excellent sash frames manufactured. Mullion bar systems are easily developed by the architect from an array of available tubular or extruded forms.

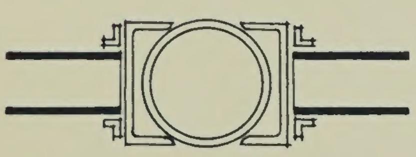


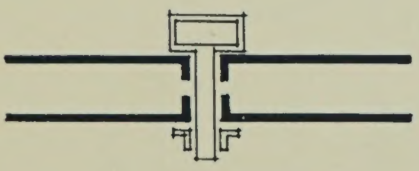
Frames are designed to completely enclose the panels on the perimeter. Stops are used at front and/or back of panel to secure within the frame.

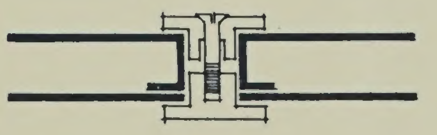


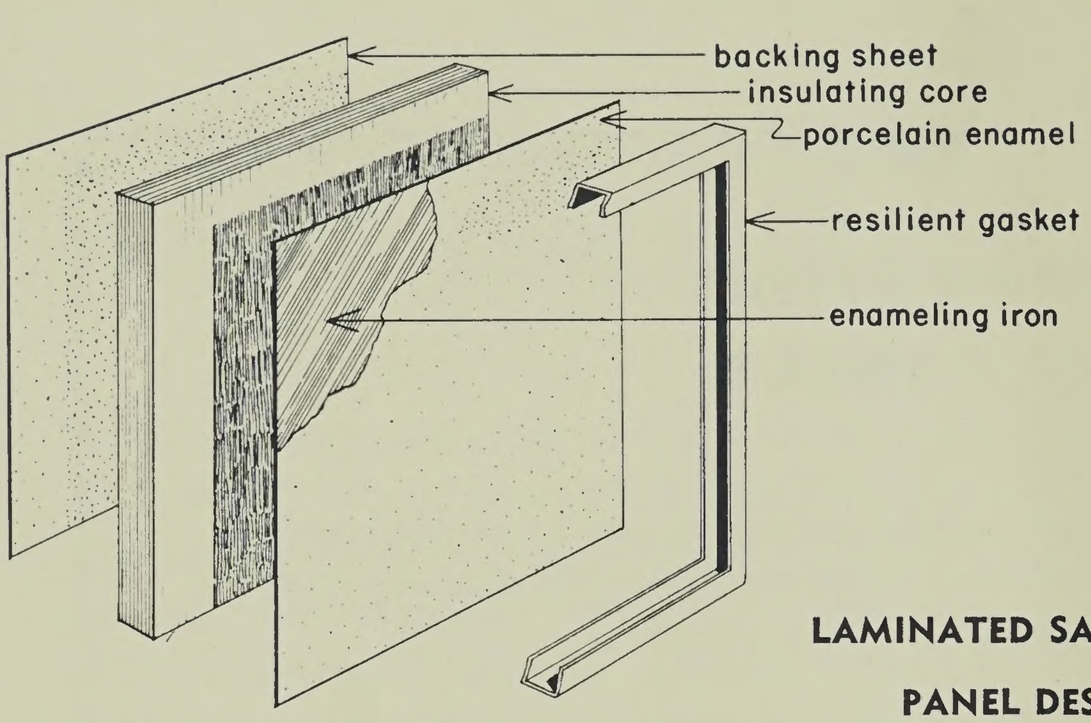
(Illustrated at the side of this page are a number of typical joinings showing the use of both types of framework.)

The supporting framework is selected or designed by the architect bearing in mind the type of Erie panel that is used. Fabrication of framing and its erection is by others, except when sash systems require installation of porcelain enamel before erection. Depending upon the design of the framework, installation of porcelain enamel may be done from either interior or exterior. Fasteners or stops must be corrosion resistant and are furnished with the framework but applied by the porcelain enamel erector.



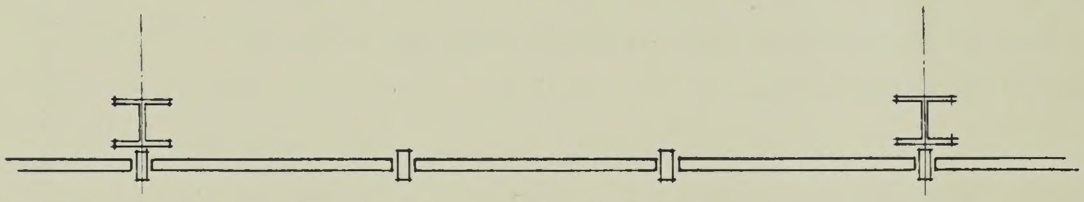




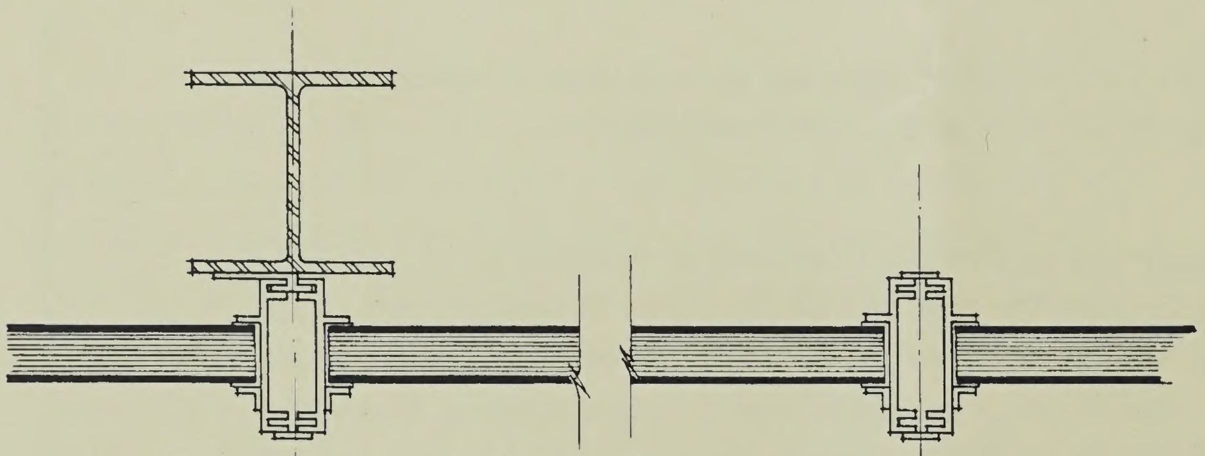


Exploded View of Laminated Panel

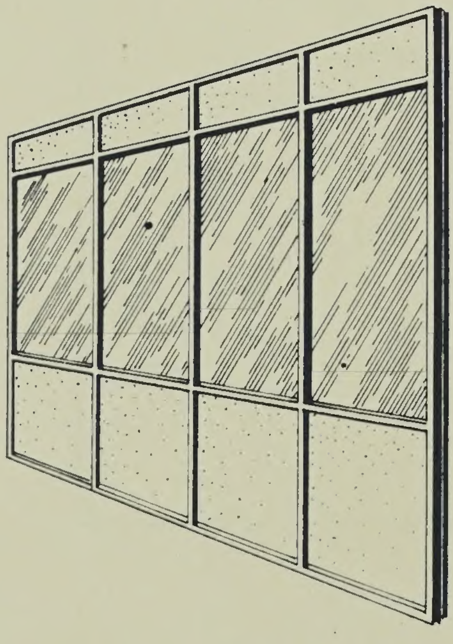
LAMINATED SANDWICH PANEL DESIGN

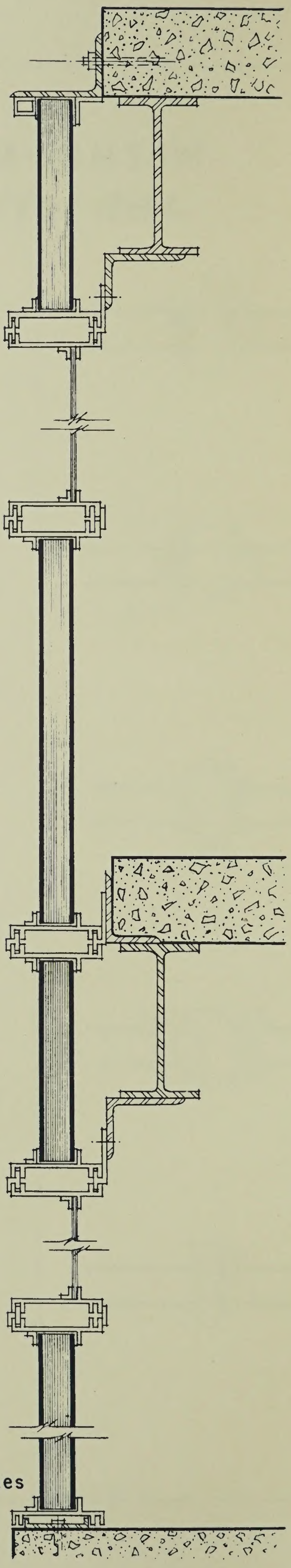


Horizontal Section—One Bay

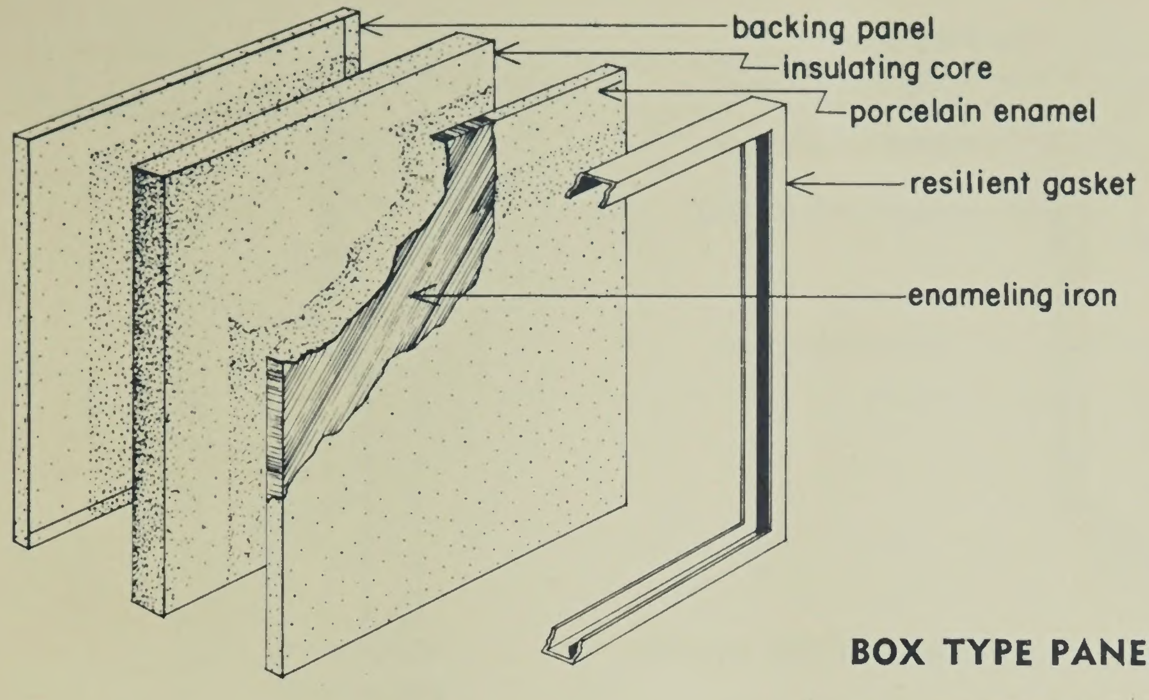


Horizontal Section
Detail at Column & Mullion





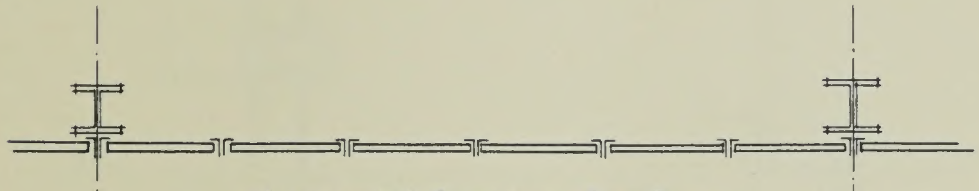
Vertical Section—Two Stories



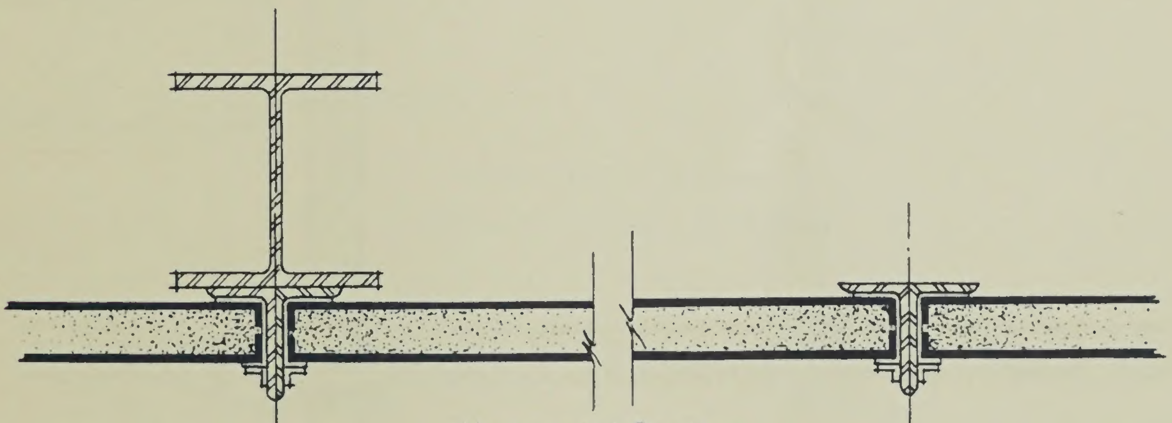
Exploded View of Panel

BOX TYPE PANEL

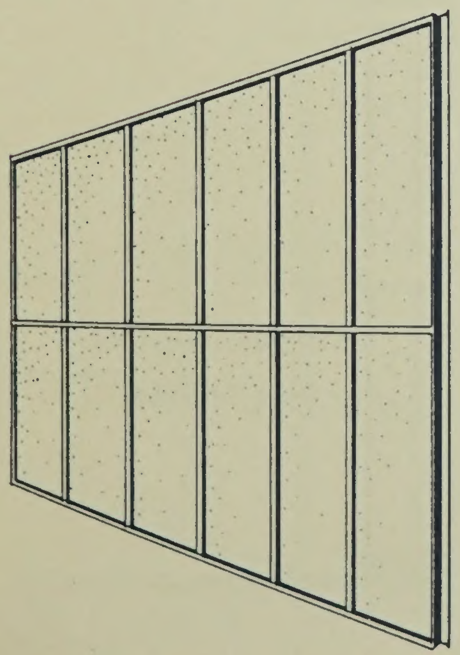
DESIGN I

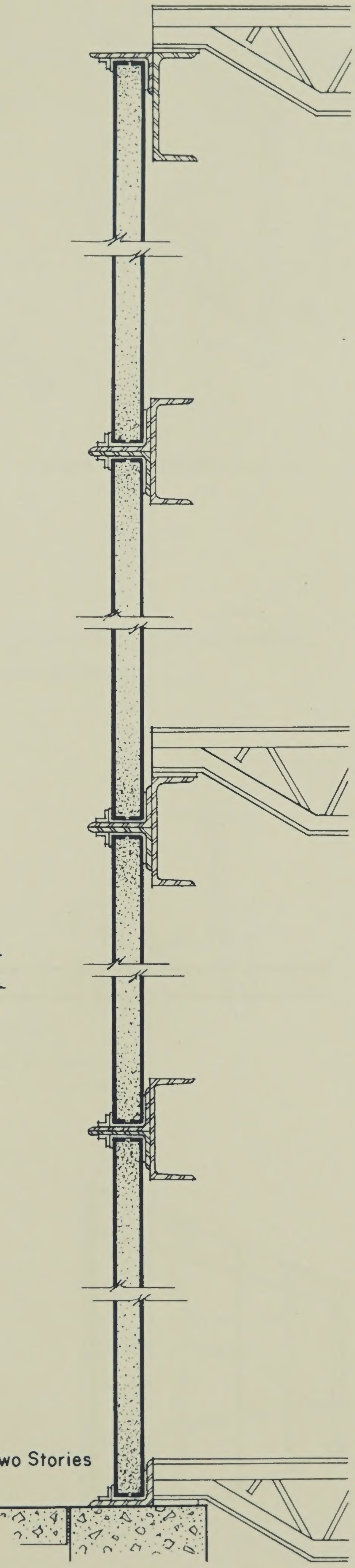


Horizontal Section—One Bay

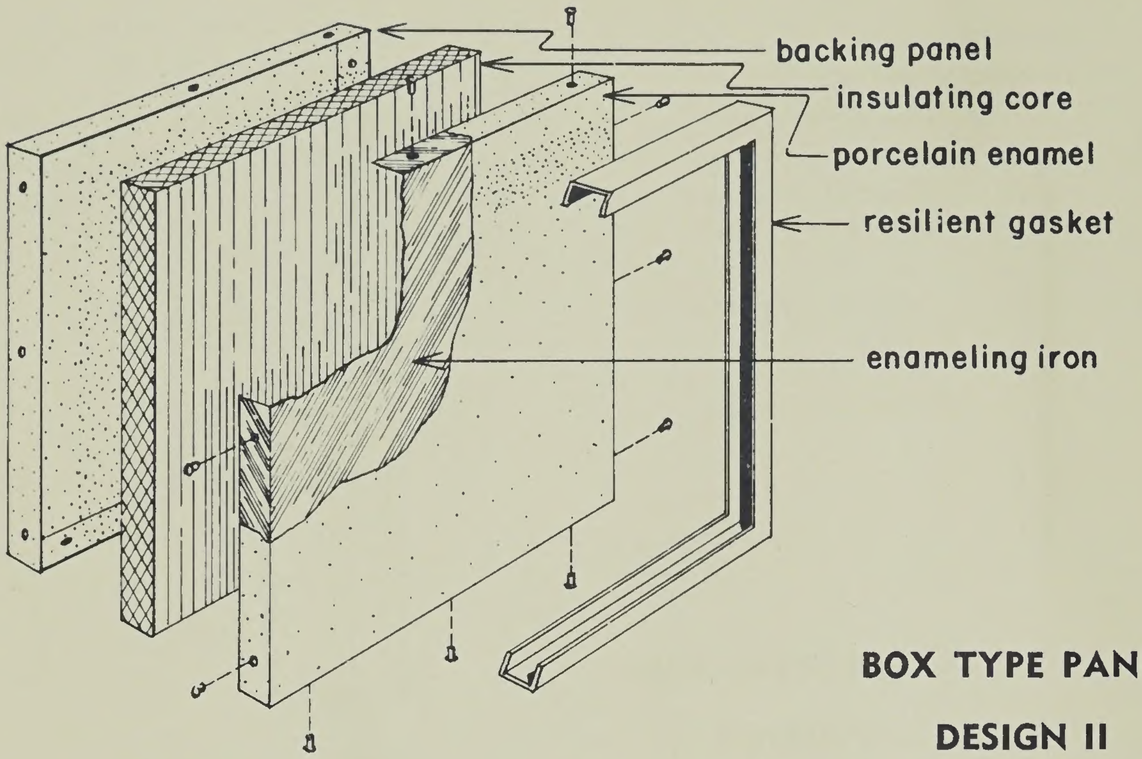


Horizontal Section
Detail at Column & Mullion



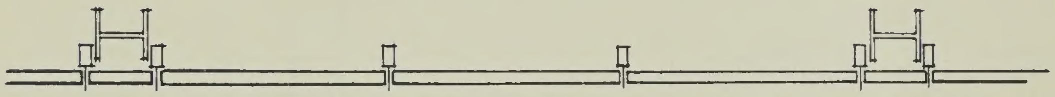


Vertical Section–Two Stories

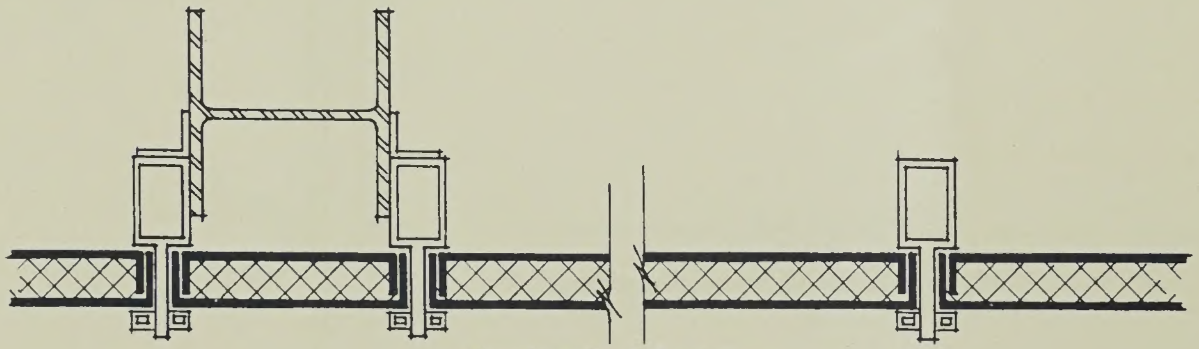


Exploded View of Panel

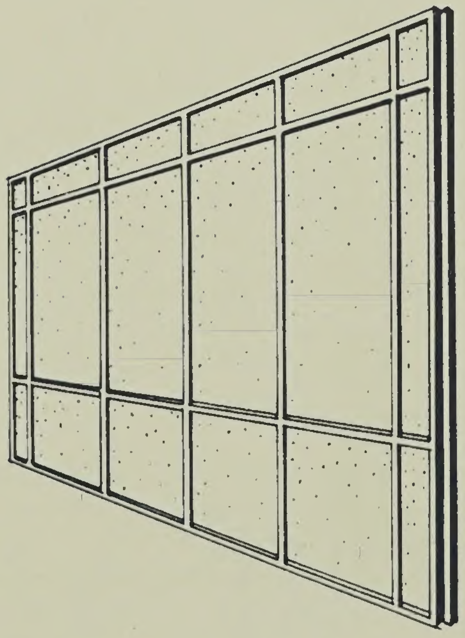
BOX TYPE PANEL
DESIGN II

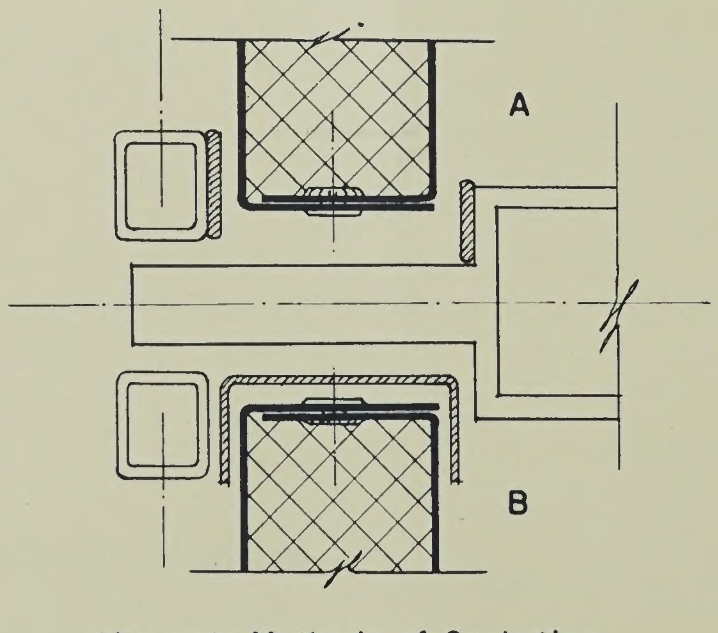


Horizontal Section—One Bay

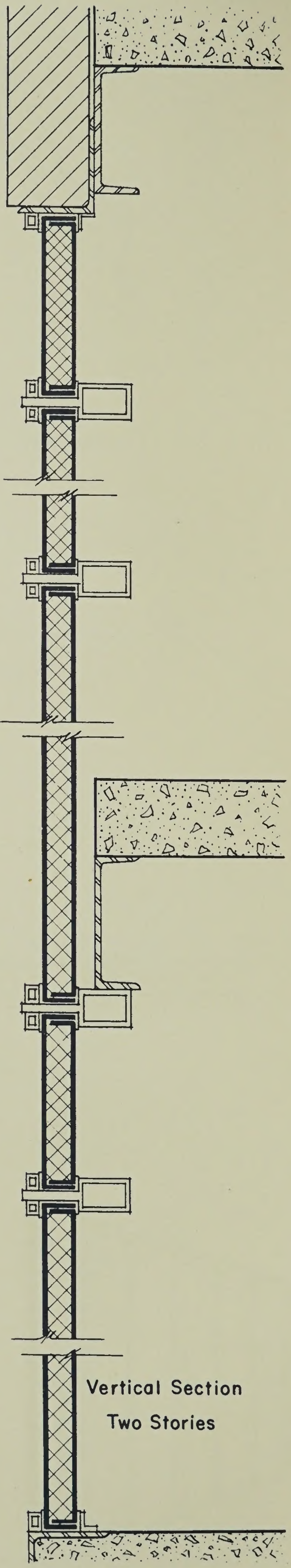


Horizontal Section
Detail at Column & Mullion

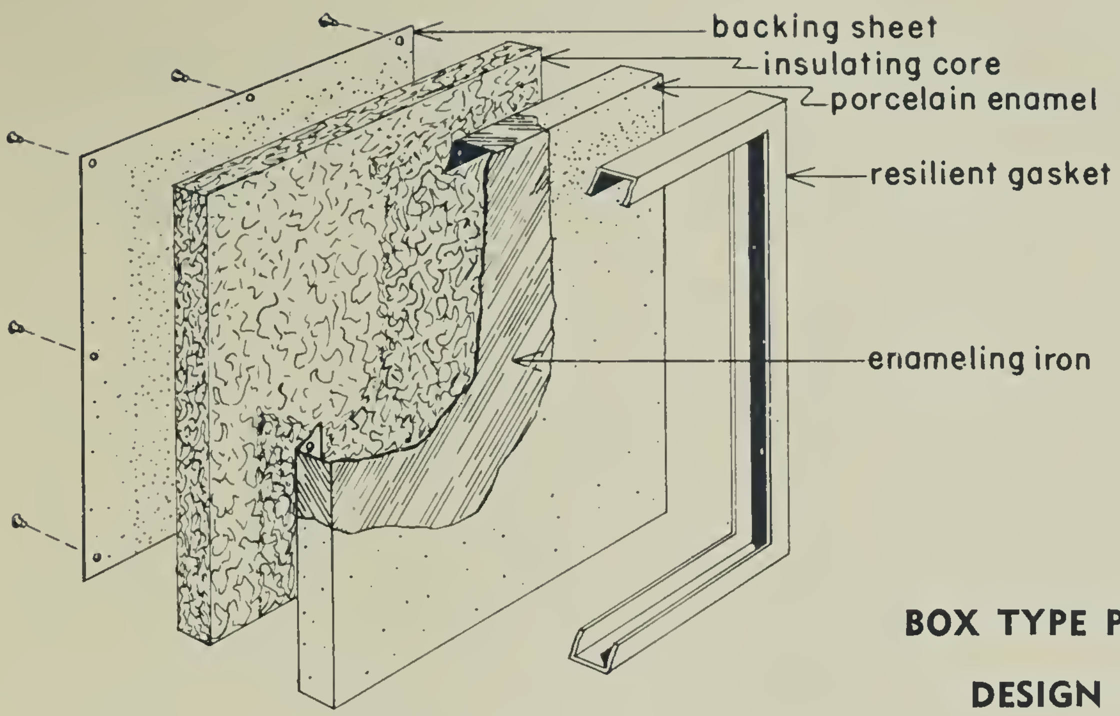




Alternate Methods of Gasketing

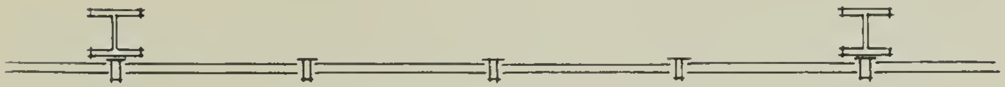


Vertical Section
Two Stories



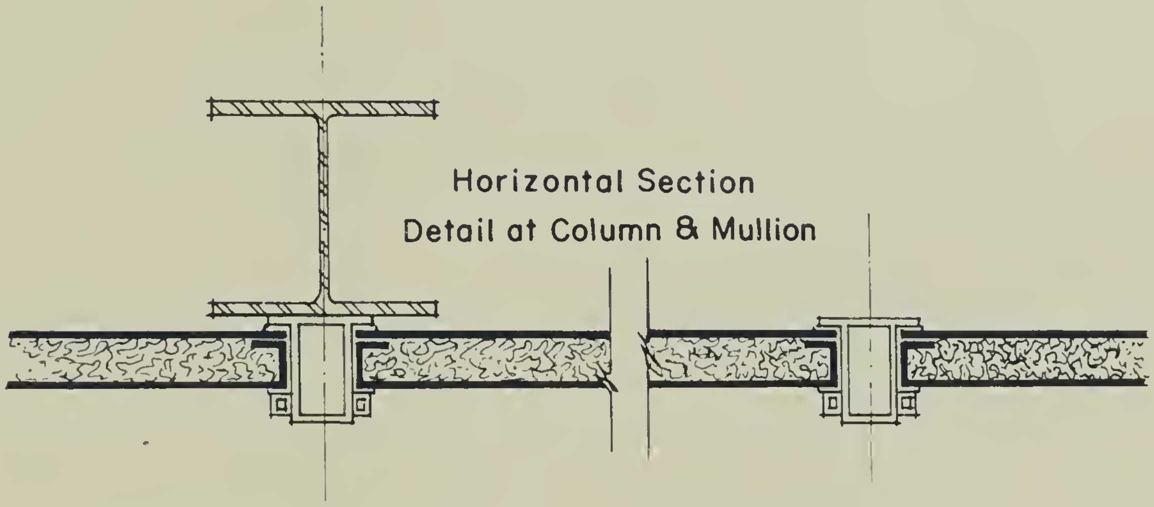
Exploded View of Panel

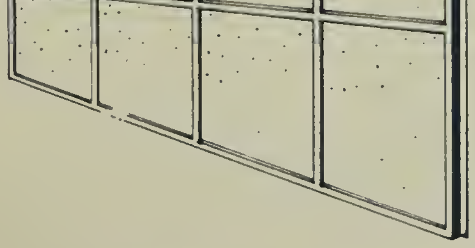
BOX TYPE PANEL
DESIGN III

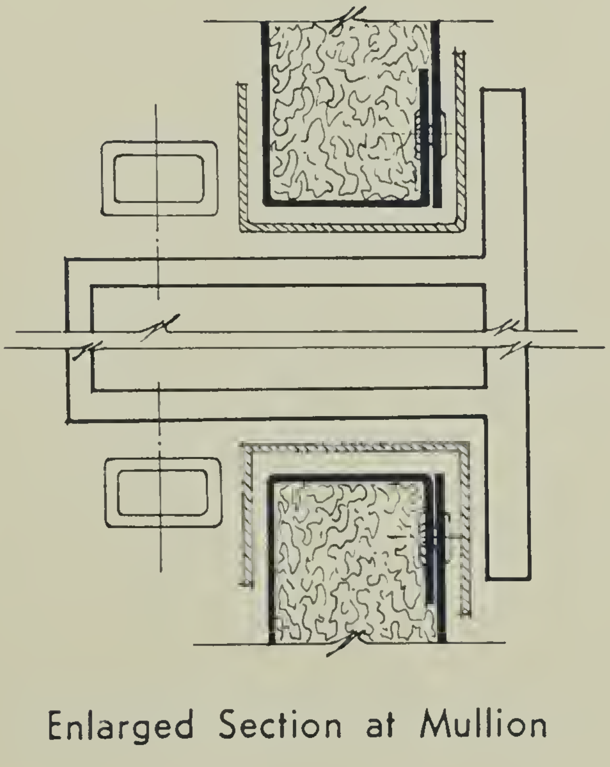


Horizontal Section—One Bay

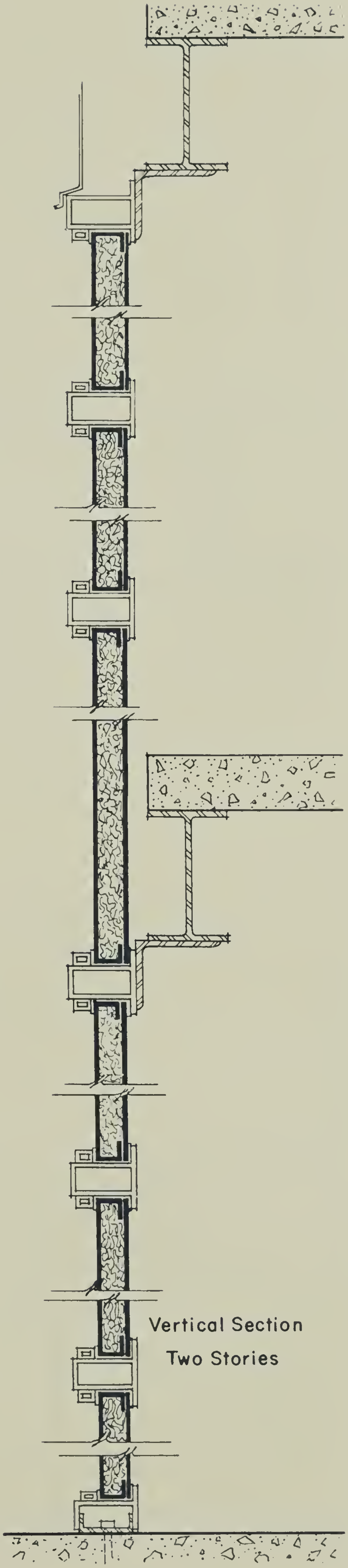
Horizontal Section
Detail at Column & Mullion





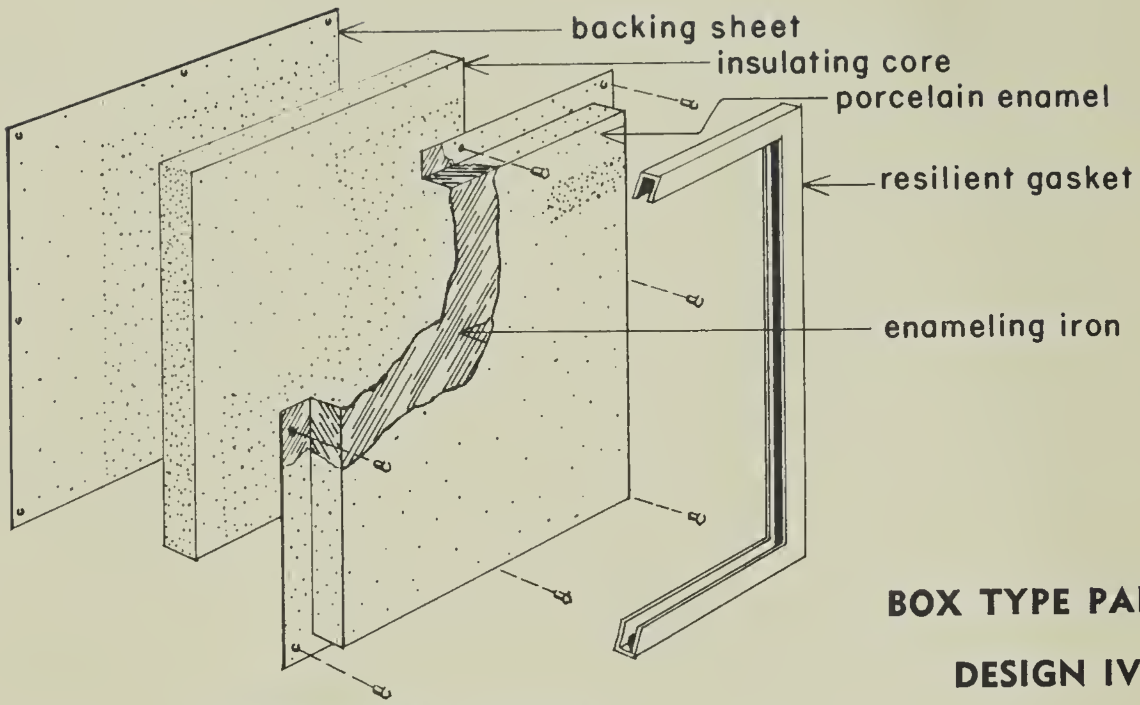


Enlarged Section at Mullion

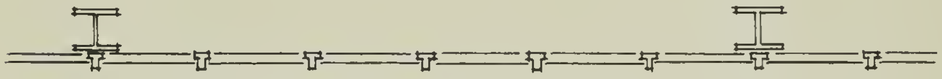


Vertical Section
Two Stories

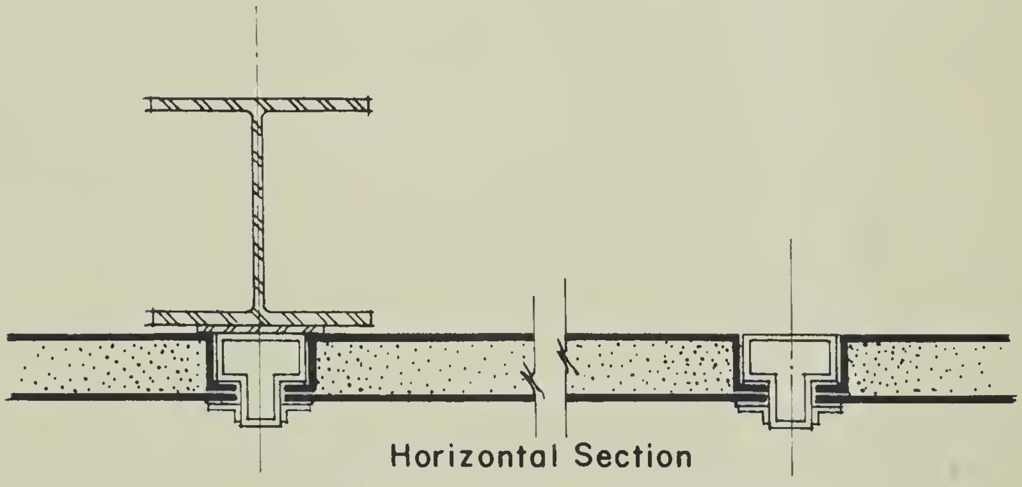
BOX TYPE PANEL
DESIGN IV



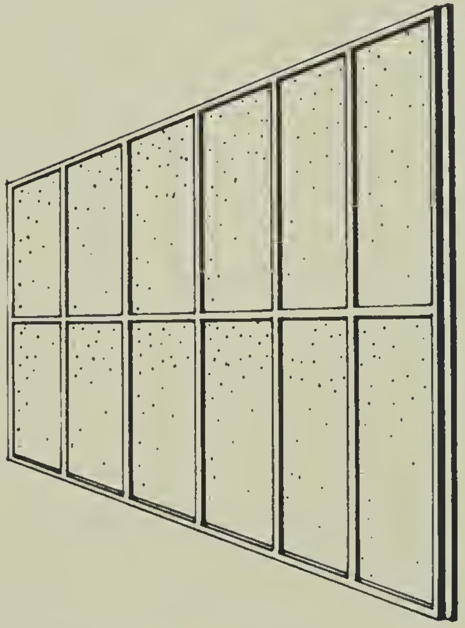
Exploded View of Panel

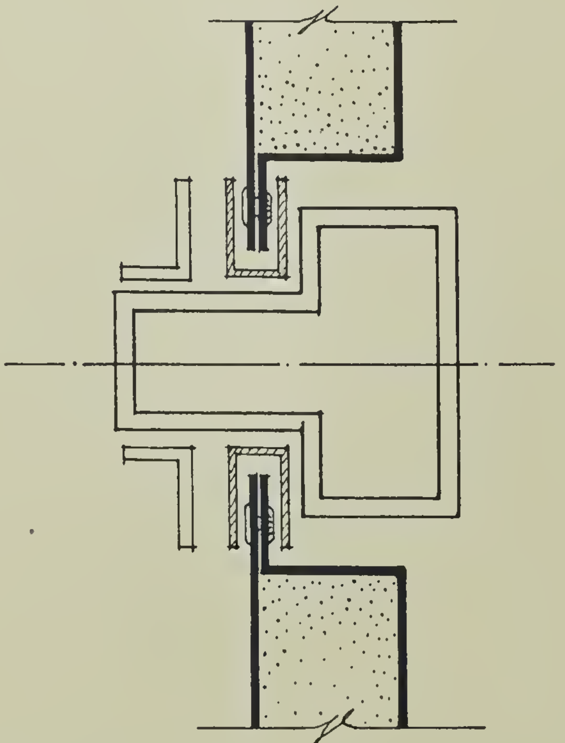


Horizontal Section—One Bay

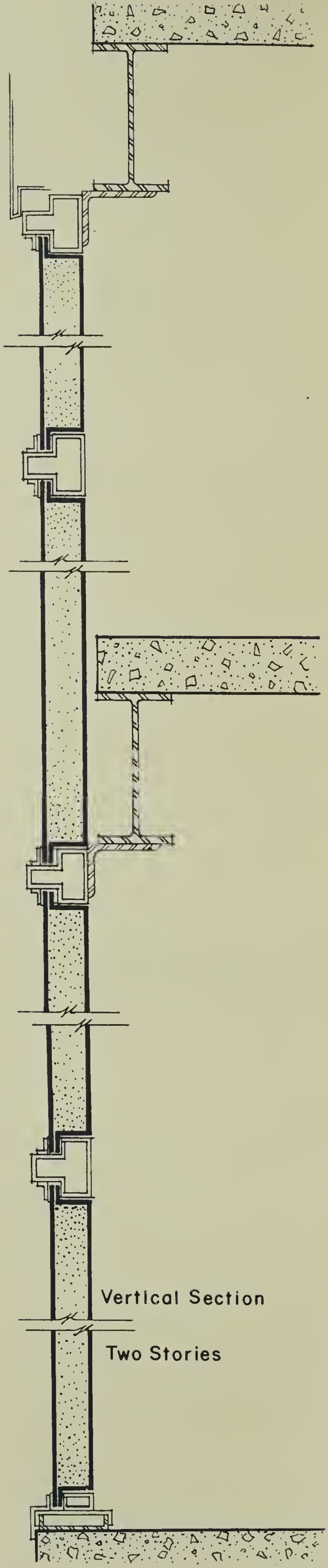


Horizontal Section
Detail at Column & Mullion





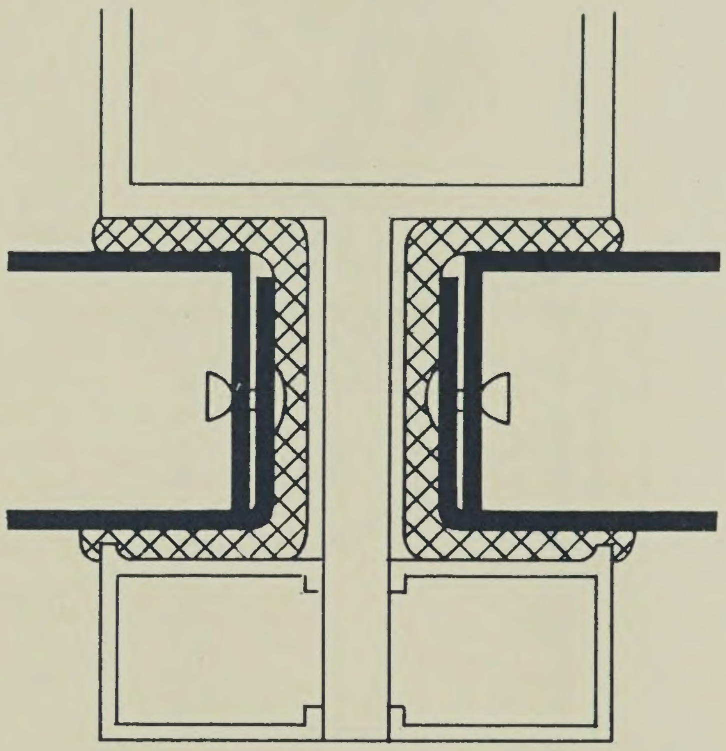
Enlarged Section at Mullion



Vertical Section
Two Stories

JOINT SEALS

Erie recommends the use of vinyl or neoprene gasketing at all joints between panels and framing, or gasketing material of this type with corrosion-proof batten strips. Joint sealing materials such as caulking mastic or glazing compounds are considered too impermanent for this type of construction and are a frequent source of costly maintenance.



Strip and Channel Type Gaskets

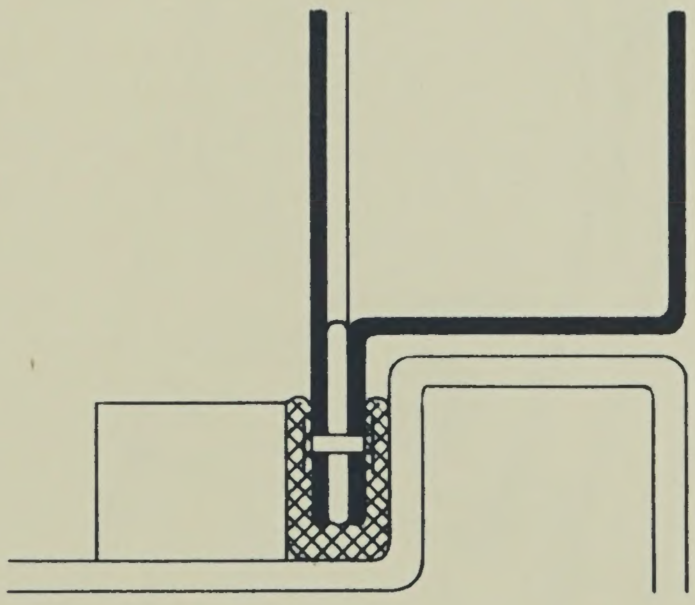
Erie has developed both strip type and channel type gaskets which are adaptable to most joints experienced between framework and panels. The materials used are highly resistant to oil and grease, sunlight, ageing, severe temperature cycles, freezing, etc. Accelerated tests of the material indicate that service life without maintenance should be for the life of the building.

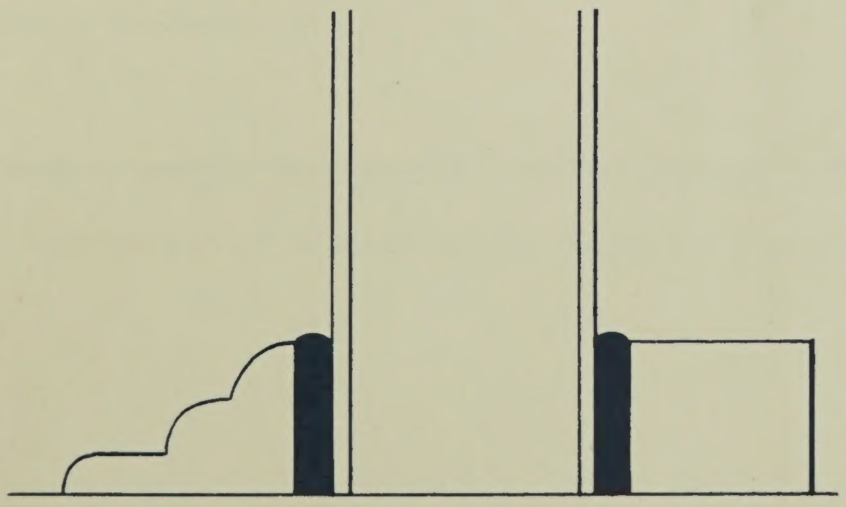
Special Gaskets Available

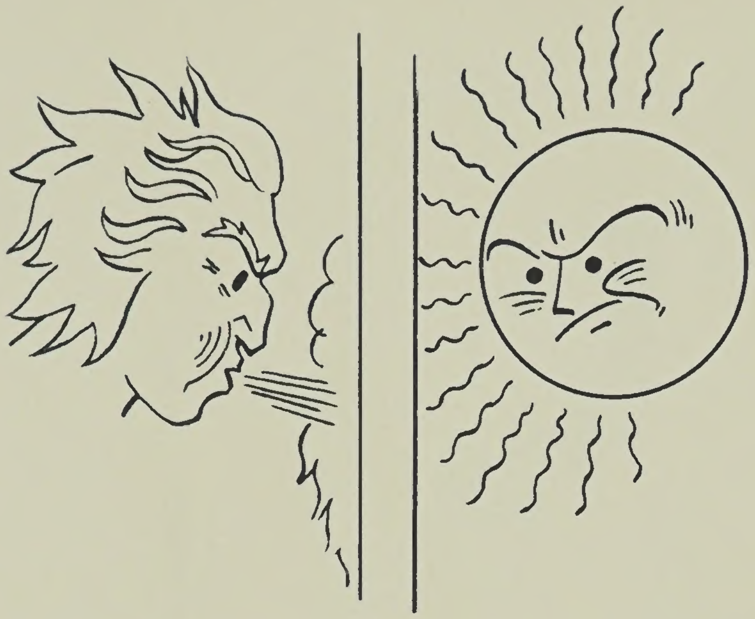
While the types of gasketing now used by Erie are satisfactory for the frame connections so far developed, Erie will cooperate with the architect in the design of special gasket forms as needed to adapt to panel or frame changes.

Internal Gaskets

The same type of gasket material may also be used in the internal assembly of Erie box type panels to seal the panel itself and limit the metal-to-metal contact.

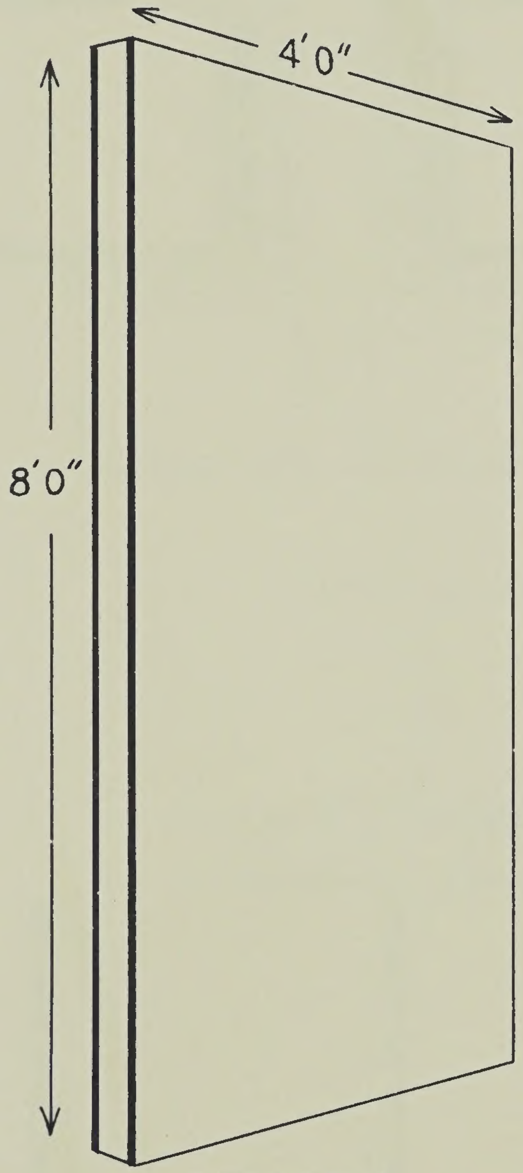






VAPOR BARRIER

Porcelain enamel is impermeable and, consequently, is a perfect vapor barrier. There can be no movement of moisture through the panel in either direction. Use of the proper type and amount of core insulation also eliminates condensation on either the inner or outer surface as a result of opposed temperatures. Internal gasketing of box type panels further seals the panel against air or moisture transfer when required.



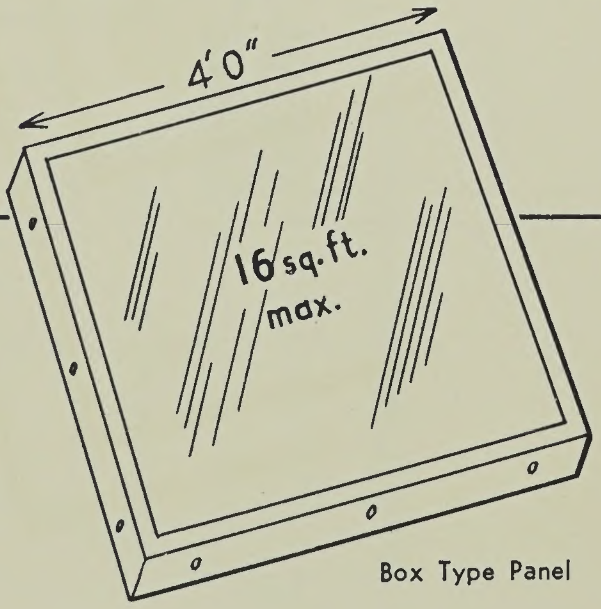
Laminated Panel

RECOMMENDED PANEL SIZES

Erie does not produce standard size panels to which you must adapt your planning. When sash frame structures are being used, the panel size is limited to the opening sizes provided by the frame makers. When the supporting structure is designed of mullion bars which may be placed by the designer, Erie recommends that modular sizes be maintained and that all panels be held within specific limits as stated in the following:

Laminated Panels	4' x 8' maximum
Box type panels	4' on the longest dimension to total not over 16 sq. ft.

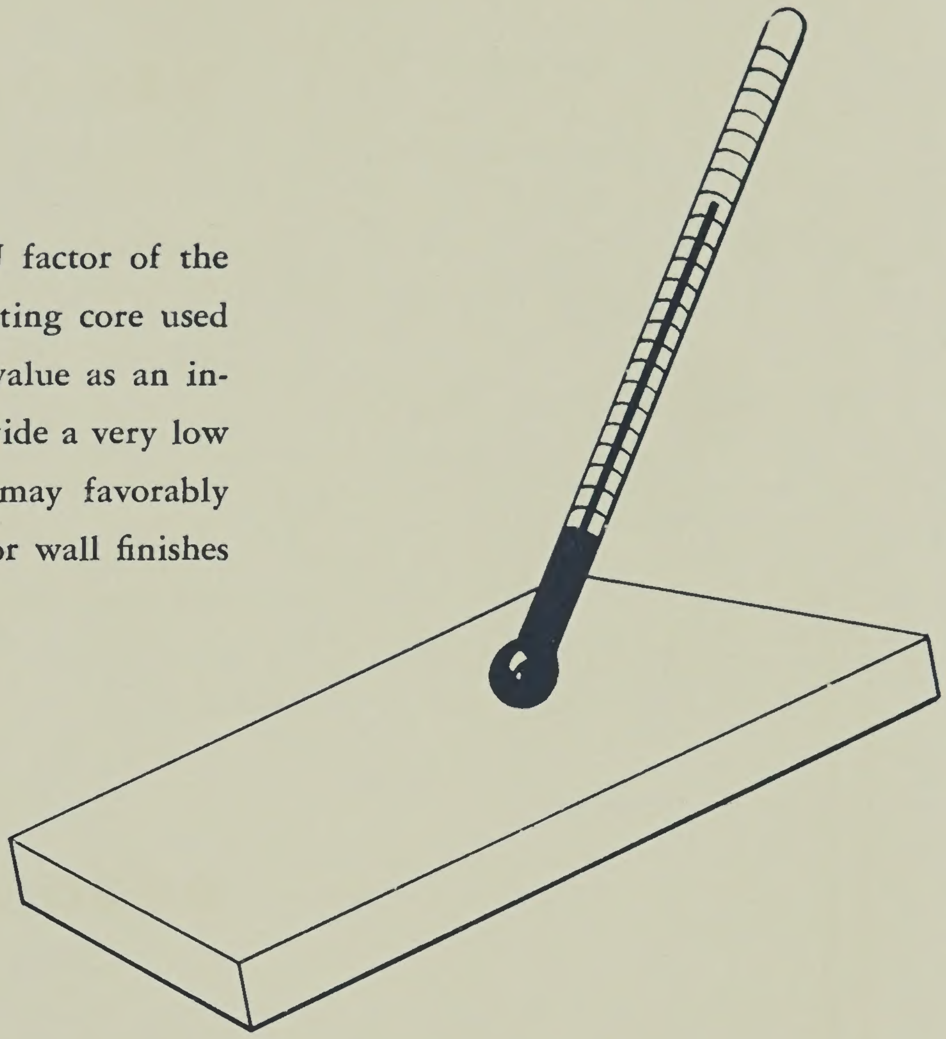
These size limitations are suggested because of a practical knowledge of what can be successfully laminated and those sizes which permit best porcelain enameling technique and quality.



Box Type Panel

K AND U FACTORS

The K factor of the Erie panel and the resulting U factor of the wall are entirely dependent upon the type of insulating core used and its thickness. Porcelain enamel itself has little value as an insulator. Insulating materials are available which provide a very low U factor, approximating .15. Other factors which may favorably affect the U factor are the use of air space or interior wall finishes of an insulating nature.



FIRE CODE REQUIREMENTS

No form of metal wall panel has yet been developed that will meet most of the obsolete fire codes for walls. In the case of Erie's method of installation, porcelain enamel is being used in the same manner as glass. This makes any wall constructed in this way become a window wall, technically, and subject to the code for windows. The Erie panel easily meets this code requirement. The Erie panels will also meet the code for walls in some cities when backed by 2 inches of insulating plaster.

Porcelain enameled steel is completely fire resistant, as it is originally fired to the steel at temperatures of between 1500 and 1600° F.

SPECIFICATIONS

GENERAL:

1. The work of this section shall include all labor and materials required for furnishing and erecting all Architectural Porcelain Enamel panels as shown on the accompanying drawings and as hereinafter specified.

2. All panels shall be completely fabricated in the shop to sizes and units as required, and installed in the frames with all fastenings necessary for the complete installation.

STANDARDS OF MANUFACTURE:

3. The manufacture of all material under these specifications shall be in accordance with all applicable requirements in the "Recommended Standards for Manufacture of Architectural Porcelain Enamel," First Edition —1946, as amended May 14, 1952, of the Architectural Division of the Porcelain Enamel Institute, Inc., Dupont Circle Building, 1346 Connecticut Avenue, N. W., Washington 6, D. C., hereinafter referred to as P. E. I. Standards.

SHOP DRAWINGS:

4. Shop drawings of porcelain enamel panels shall be prepared and submitted to the Architect for approval prior to the start of any fabrication.

SAMPLES:

5. Samples of colors and surface texture shall be submitted to the Architect for approval prior to porcelain enameling of any material.

DESCRIPTION OF UNITS:

6. Panel wall units shall be Erie Panel Wall, manufactured by The Erie Enameling Company, 1400 West 20th Street, Erie, Pennsylvania.

7. The panel unit shall be (1) Laminated Sandwich, (2) Box Panel, (3) Flanged Box Panel (specify one or more as indicated on drawings).

8. The exterior of the unit shall be porcelain enamel; the interior of the unit shall be (a) Porcelain Enamel, (b) Galvanized Iron, (c) Stainless Steel, (d) Aluminum, (e) other material. (Specify one or more.)

9. The core material shall be .... and shall be .... inches thick.

ERECTION:

10. It shall be the responsibility of this contractor to coordinate the erection of this material with the erection of the framing members that there shall be no delay in the completion of the project and that complete and proper weather protection of the units shall be obtained; or, (Alternate 10) all panel wall units shall be supplied to the framing manufacturer for installation prior to the erection of the framing units.

11. All units shall be accurately and securely erected, and properly sealed against weather penetration.

12. All fastening materials shall be (1) furnished and installed by this contractor, (2) furnished by the framing manufacturer and installed by this contractor, (3) furnished and installed by the framing manufacturer. (Specify one.)

13. All units shall be transported, unloaded, stored, handled and erected with proper care. Dented, sprung, bent, chipped or otherwise damaged units will not be accepted; and if erected, must be replaced by undamaged units.

CLEANING:

14. Upon completion of erection and sealing of all units and the completion of the related work, all exposed porcelain enamel surfaces shall be thoroughly cleaned.

GUARANTEE:

15. All work performed under this contract shall be in exact accord with all applicable requirements of Specifications No. 1 of the Architectural Division, Porcelain Enamel Institute, Inc., and is guaranteed for the period of one year from date of completion, against failure caused by defective workmanship or materials.

CHICAGO OFFICE AND WAREHOUSE:
5911 SOUTH KEDZIE AVENUE

PHILADELPHIA OFFICE:
236 EAST PARK AVENUE AMBLER, PENNA.

THE
Erie
ENAMELING
COMPANY
ERIE, PENNSYLVANIA

LITHO IN U.S.A.